

WHAT IS CLAIMED:

1. A developer regulating member, comprising:

a developer regulating part adapted to oppose a surface of a developer carrier adapted to regulate an amount of developer carried and conveyed by the developer carrier,

5 wherein the developer regulating member is formed from a metallic member and comprises a space facing an inner surface of the metallic member and being adapted to extend in a direction perpendicular to a moving direction of the surface of the developer carrier.

2. The developer regulating member according to claim 1,

10 wherein the developer is substantially continuous at a location adapted to be provided opposite to the surface of the developer carrier.

3. The developer regulating member according to claim 1, wherein a cooling medium contacts the inner surface of the metallic member facing the space.

15

4. The developer regulating member according to claim 1, wherein the metallic member comprises a single metallic plate member and at least the developer regulating part is formed by bending the metallic plate member.

20 5. The developer regulating member according to claim 1, wherein the metallic member is a metallic plate member, the developer regulating member is formed by bending the metallic plate member at a plurality of positions forming a plurality of bent parts, and the developer regulating part is constructed from a flat part formed between two bent parts of the plurality of bent parts.

25

6. The developer regulating member according to claim 1, wherein the metallic member is a metallic plate member, wherein the developer regulating member is formed by bending the metallic plate member at a plurality of positions forming a plurality of bent parts, and the developer regulating part is constructed from an edge line portion of one bent part of the plurality of bent parts.

7. The developer regulating member according to claim 6, wherein the developer regulating member has a substantially triangular cross section, and an angle formed between two sides at any one bent part of the plurality of bent parts is less than 90 degrees.

8. The developer regulating member according to claim 6, wherein the developer regulating member has a substantially polygonal cross section.

9. A developing device, comprising:

a developer carrier configured to carry and convey a developer; and

a developer regulating member comprising:

a developer regulating part opposing a surface of the developer carrier configured to regulate the developer carried and conveyed by the developer carrier,

wherein the developer regulating member is formed from a metallic member, comprises a space facing an inner surface of the metallic member and extending in a direction perpendicular to a moving direction of the surface of the developer carrier.

10. The developing device according to claim 9, further comprising a cooling device configured to cool the developer regulating member from an inner surface side of the metallic member facing the space.

11. The developing device according to claim 9, wherein the cooling device cools the developer regulating member by contacting a cooling medium with the inner surface of the metallic member facing the space.

5

12. The developing device according to claim 9, wherein the metallic member is a single metallic plate member, and at least the developer regulating part is formed by bending the metallic plate member.

10

13. The developing device according to claim 9, wherein the developer regulating part is spaced from the surface of the developer carrier.

14. The developing device according to claim 10, wherein the cooling device is configured to supply gas into the space.

15

15. The developing device according to claim 14, wherein a temperature of the gas supplied by the cooling device is lower than a temperature of ambient air.

16. The developing device according to claim 10, wherein the cooling device is configured to flow a cooling liquid through the space.

20

17. The developing device according to claim 10, wherein the cooling device comprises a bar-shaped heat transferring member configured to transfer heat from the developer regulating member and disposed such that the heat transferring member runs through the space, and a heat

dissipating member configured to dissipate the heat from an end portion of the heat transferring member.

18. The developing device according to claim 9, wherein the metallic member is a metallic plate member, the developer regulating member is formed by bending the metallic plate member at a plurality of positions forming a plurality of bent parts, and the developer regulating part is constructed from a flat part formed between two bent parts of the plurality of bent parts.

19. The developing device according to claim 9, wherein the metallic member is a metallic plate member, the developer regulating member is formed by bending the metallic plate member at a plurality of positions forming a plurality of bent parts, and the developer regulating part is constructed from an edge line portion of one bent part of the plurality of bent parts.

20. The developing device according to claim 19, wherein the developer regulating member has a substantially triangular cross section, and an angle formed between two sides at any one bent part of the plurality of bent parts is less than 90 degrees.

21. The developing device according to claim 19, wherein the developer regulating member has a substantially polygonal cross section.

22. The developing device according to claim 9, wherein the developer comprises a toner and a magnetic carrier, and a particle diameter of the magnetic carrier is from about 20  $\mu\text{m}$  to about 50  $\mu\text{m}$ .

23. The developing device according to claim 9, wherein the developer comprises a toner and a magnetic carrier, the magnetic carrier includes a core material and a coating layer covering the core material, and the coating layer contains a melamine resin crosslinked with a thermoplastic resin and a charge controlling agent.

24. The developing device according to claim 9, wherein the developer comprises a toner and a magnetic carrier, and a ratio of a volume-based average particle diameter of the toner to a number-based average particle diameter of the toner is from about 1.05 to about 1.30.

25. The developing device according to claim 24, wherein the ratio of the volume-based average particle diameter of the toner to the number-based average particle diameter of the toner is from about 1.10 to about 1.25.

26. The developing device according to claim 9, wherein the developer comprises a toner and a magnetic carrier, and an average circularity of the toner is from about 0.95 to about 0.99.

27. The developing device according to claim 26, wherein the average circularity of the toner is from about 0.96 to about 0.99.

28. The developing device according to claim 27, wherein a concentration of toner particles having a circularity less than 0.95 is not greater than 10%.

29. The developing device according to claim 9, wherein the developer comprises a toner and a magnetic carrier, and the toner is prepared by dispersing a mixture of toner constituents, including at least a prepolymer, a colorant, and a release agent in an aqueous medium in the presence of a particulate resin to perform an addition polymerization reaction.

5

30. The developing device according to claim 9, wherein the developer comprises a toner and a magnetic carrier, and a shape factor “SF-1” of the toner calculated according to the following equation is from about 120 to about 180:

$$SF-1 = \{(MXLNG)^2 / AREA\} \times (100\pi / 4),$$

10 where “MXLNG” is a maximum length of a major axis of an elliptical-shaped figure obtained by projecting a toner particle on a two dimensional plane, and “AREA” is an area of the elliptical-shaped figure.

31. The developing device according to claim 9, wherein the developer comprises a  
15 toner and a magnetic carrier, a particle diameter of the magnetic carrier is from about 20 μm to about 50 μm, the magnetic carrier includes a core material and a coating layer covering the core material, the coating layer contains a melamine resin crosslinked with a thermoplastic resin and a charge controlling agent, and the toner is prepared by dispersing a mixture of toner constituents including at least a prepolymer, a colorant, and a release agent in an aqueous  
20 medium in the presence of a particulate resin to perform an addition polymerization reaction.

32. An electrophotographic image forming process cartridge for use in an image forming apparatus, comprising at least:

an image carrier configured to carry an image; and

a developing device configured to develop a latent image to form a toner image on the image carrier, the developing device comprising:

a developer carrier configured to carry and convey a developer; and

5 a developer regulating member comprising a developer regulating part opposing a surface of the developer carrier to regulate the developer carried and conveyed by the developer carrier,

wherein the developer regulating member is formed from a metallic member and comprises a space facing an inner surface of the metallic member and extending in a direction perpendicular to a moving direction of the surface of the developer carrier.

10

33. The electrophotographic image forming process cartridge according to claim 32, wherein the metallic member is a single metallic plate member.

15 34. The electrophotographic image forming process cartridge according to claim 32, further comprising a cooling device configured to cool the developer regulating member from an inner surface side of the metallic member facing the space.

35. An image forming apparatus, comprising:

an image carrier configured to carry an image;

20 an exposing device configured to form a latent image on a surface of the image carrier; and

a developing device configured to develop the latent image to form a toner image on the image carrier, the developing device comprising:

a developer carrier configured to carry and convey a developer; and

a developer regulating member comprising a developer regulating part opposing a surface of the developer carrier to regulate the developer carried and conveyed by the developer carrier,

wherein the developer regulating member is formed from a metallic member and comprises a space that faces an inner surface of the metallic member, and the space extends in a direction perpendicular to a moving direction of the surface of the developer carrier.

36. The image forming apparatus according to claim 35,

wherein the metallic member is a single metallic plate member.

37. The image forming apparatus according to claim 35, further comprising a cooling device configured to cool the developer regulating member from an inner surface side of the metallic member facing the space.

38. A developer regulating member, comprising:

developer regulating means adapted for regulating a developer carried and conveyed by a developer carrying and conveying means for carrying and conveying a developer, the developer regulating means adapted to be provided opposite a surface of the developer carrying and conveying means,

wherein the developer regulating member is formed from a metallic member and comprises a space that faces an inner surface of the metallic member, and the space is adapted to extend in a direction perpendicular to a moving direction of the surface of the developer carrying and conveying means.



39. The developer regulating member according to claim 38,  
wherein the metallic member is a single metallic plate member.

40. A developing device, comprising:

5 developer carrying and conveying means for carrying and conveying a developer; and  
a developer regulating member comprising:

developer regulating means for regulating the developer carried and conveyed by  
the developer carrying and conveying means, the developer regulating means opposing a  
surface of the developer carrying and conveying means,

10 wherein the developer regulating member is formed from a metallic member  
and comprises a space that faces an inner surface of the metallic member, and the space  
extends in a direction perpendicular to a moving direction of the surface of the developer  
carrying and conveying means.

15 41. The developing device according to claim 40,  
wherein the metallic member is a single metallic plate member.

42. The developing device according to claim 40, further comprising cooling means for  
cooling the developer regulating member from an inner surface side of the metallic member  
20 facing the space.

43. The developing device according to claim 40, wherein the cooling means is  
configured to supply gas into the space.

44. The developing device according to claim 40, wherein the cooling means is configured to flow a cooling liquid through the space.

45. The developing device according to claim 40, wherein the cooling means includes a heat transferring means for transferring heat from the developer regulating member and a heat dissipating means for dissipating the heat from an end portion of the heat transferring means, and the heat transferring means is disposed such that the heat transferring means runs through the space.

46. An electrophotographic image forming process cartridge for use in an image forming apparatus, comprising at least:

an image carrying means for carrying an image; and

a developing means for developing a latent image to form a toner image on the image carrying means, the developing means comprising:

developer carrying and conveying means for carrying and conveying a developer; and

a developer regulating member comprising developer regulating means for regulating the developer carried and conveyed by the developer carrying and conveying means, the developer regulating means opposing a surface of the developer carrying and conveying means,

wherein the developer regulating member is formed from a metallic member and comprises a space that faces an inner surface of the metallic member, and the space extends in a direction perpendicular to a moving direction of the surface of the developer carrying and conveying means.

47. The electrophotographic image forming process cartridge for use in an image forming apparatus according to claim 46,

wherein the metallic member is a single metallic plate member.

5           48. The electrophotographic image forming process cartridge according to claim 46, further comprising cooling means for cooling the developer regulating member from an inner surface side of the metallic member facing the space.

49. An image forming apparatus, comprising:

10           an image carrying means for carrying an image;

            a latent image forming means for forming a latent image on a surface of the image carrying means; and

            developing means for developing the latent image to form a toner image on the image carrying means, the developing means comprising:

15           developer carrying and conveying means for carrying and conveying a developer; and

            a developer regulating member comprising developer regulating means for regulating the developer carried and conveyed by the developer carrying and conveying means, the developer regulating means opposing a surface of the developer carrying and conveying means,

20           wherein the developer regulating member is formed from a metallic member and comprises a space that faces an inner surface of the metallic member, and the space extends in a direction perpendicular to a moving direction of the surface of the developer carrying and conveying means.

50. The image forming apparatus according to claim 49,  
wherein the metallic member is a single metallic plate member.

51. The image forming apparatus according to claim 49, further comprising cooling  
5 means for cooling the developer regulating member from an inner surface side of the metallic  
member facing the space.